



CIVIL QUALITY CONSULTANTS & ENGINEERS

(Buildings Geo-Tech & Highway Materials Testing Laboratory)

An ISO 9001: 2008 Certified Company



Job No.: CQCE/BBMP/BBU/ 2017-18

Date: 17.01.2018

TEST REPORT

CLIENT	:	Executive Engineer, Byatarayanapura division, BBMP, Bangalore.
AGENCY	:	Sri. B.B. Umesh, Contractor, Bangalore.
NAME OF WORK	:	Ammentties Construction of RO Water Plant Bangaluru one Center Providing Sodiun Vapour Lights Sign Boards in Ward No. 9 10 and 11 Byatarayanapura Division as per Annexure GO NO UDD 217 SFC 2016 Dated 28.05.2016 Works Sl No. for Ward 09 33 to 34 Ward No.10 35 to 38 Ward No. 22 39 to 48, BBMP, Bangalore.
TYPE OF MIX	:	Bituminous Concrete
PERIOD OF TESTING	:	15.01.2017

The results of the tests conducted on the Bitumen sample for Bituminous Concrete

Sl.No	Description	Test Method as per IS	Test Result	Requirement as per IS: 73-2013
1	Penetration at 25°C, 100g, 5 Sec 1/10 mm	IS: 1203-1978 (RA-2009)	65	60 to 70
2	Softening point, °C	IS: 1205-1978 (RA-2009)	48	Min. 45
3	Ductility at 27°C, cm	IS: 1208-1978 (RA-2009)	100 >	Min. 50
4	Flash Point, °C	IS: 1209-1978 (RA-2009)	294	Min. 220

Note:

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Job No.: CQCE/BBMP/BBU/ 2017-18

17.01.2018

Aggregate Gradation Test IS : 2386 Part I

Client	Executive Engineer, Byatarayanapura division, BBMP, Bangalore.
Agency	Sri B.B. Umesh, Contractor, Bangalore.
Name of the Work	Ammentties Construction of RO Water Plant Bangaluru one Center Providing Sodiun Vapour Lights Sign Boards in Ward No. 9 10 and 11 Byatarayanapura Division as per Annexure GO NO UDD 217 SFC 2016 Dated 28.05.2016 Works SI No. for Ward 09 33 to 34 Ward No.10 35 to 38 Ward No. 22 39 to 48, BBMP, Bangalore.
Type of Mix	Bituminous Concrete
Date of Testing	17.01.2018

Total Weight of Sample: 5550 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	JOBMIX Gradation as per MORTH	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	584	10.52	10.52	89.48	79 - 100	
9.5	519	9.35	19.87	80.13	70 - 88	
4.75	762	13.73	33.60	66.40	53 - 71	
2.36	638	11.50	45.10	54.90	42 - 58	
1.18	515	9.28	54.38	45.62	34 - 48	
0.600	525	9.46	63.84	36.16	26 - 38	
0.300	795	14.32	78.16	21.84	18 - 28	
0.150	365	6.58	84.74	15.26	12 - 20	
0.075	482	8.68	93.42	6.58	4 - 10	

Total Weight of Sample: 4800 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	JOBMIX Gradation as per MORTH	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	635	13.23	13.23	86.77	79 - 100	
9.5	485	10.10	23.33	76.67	70 - 88	
4.75	536	11.17	34.50	65.50	53 - 71	
2.36	620	12.92	47.42	52.58	42 - 58	
1.18	485	10.10	57.52	42.48	34 - 48	
0.600	632	13.17	70.69	29.31	26 - 38	
0.300	418	8.71	79.40	20.60	18 - 28	
0.150	362	7.54	86.94	13.06	12 - 20	
0.075	310	6.46	93.40	6.60	4 - 10	

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Job No.: CQCE/BBMP/BBU/ 2017-18

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Aggregate Impact Value

IS: 2386 Part IV

Client	Executive Engineer, Byatarayanapura division, BBMP, Bangalore.
Agency	Sri. B.B. Umesh, Contractor, Bangalore.
Name of the Work	Ammentties Construction of RO Water Plant Bangaluru one Center Providing Sodiun Vapour Lights Sign Boards in Ward No. 9 10 and 11 Byatarayanapura Division as per Annexure GO NO UDD 217 SFC 2016 Dated 28.05.2016 Works SI No. for Ward 09 33 to 34 Ward No.10 35 to 38 Ward No. 22 39 to 48, BBMP, Bangalore.
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	17.01.2018

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	378	380	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	89	87	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	289	293	
4	Aggregate Impact value = percent fines			23.22
	$100 * (W_2/W_1)$ percent	23.54	22.89	

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

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Aggregate Impact Value

IS: 2386 Part IV

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Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	17.01.2018

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	375	377	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	83	85	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	292	292	
4	Aggregate Impact value = percent fines			22.34
	$100 * (W_2 / W_1)$ percent	22.13	22.55	

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

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Aggregate Impact Value

IS: 2386 Part IV

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Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	17.01.2018

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	378	380	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	85	87	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	293	293	
4	Aggregate Impact value = percent fines			22.69
	$100 * (W_2 / W_1)$ percent	22.49	22.89	

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

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IS: 2386 Part IV

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Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	18.01.2018

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	381	382	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	87	89	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	294	293	
4	Aggregate Impact value = percent fines	22.83	23.30	23.07
	$100 * (W_2 / W_1)$ percent			

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

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Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	18.01.2018

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	374	376	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	86	88	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	288	288	
4	Aggregate Impact value = percent fines	22.99	23.40	23.20
	$100 * (W_2 / W_1)$ percent			

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

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Aggregate Impact Value

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Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	18.01.2018

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	380	382	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	89	91	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	291	291	
4	Aggregate Impact value = percent fines			23.62
	$100 * (W_2 / W_1)$ percent	23.42	23.82	

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

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DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	Executive Engineer, Byatarayanapura division, BBMP, Bangalore.
Agency	Sri. B.B. Umesh, Contractor, Bangalore.
Name of Work	Ammentties Construction of RO Water Plant Bangaluru one Center Providing Sodiun Vapour Lights Sign Boards in Ward No. 9 10 and 11 Byatarayanapura Division as per Annexure GO NO UDD 217 SFC 2016 Dated 28.05.2016 Works SI No. for Ward 09 33 to 34 Ward No.10 35 to 38 Ward No. 22 39 to 48, BBMP, Bangalore.
Technical Reference	IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	Bituminous Concrete
Date of Testing	17.01.2018

Result : Flakiness Index = 13.21%

Elongation Index = 14.52%

Result : Combined Flakiness & Elongation index

27.73%

Comments:

→ Maximum allowable Flakiness & Elongation Index for Bituminous Concrete is 30%

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Client	Executive Engineer, Byatarayanapura division, BBMP, Bangalore.
Agency	Sri. B.B. Umesh, Contractor, Bangalore.
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Technical Reference	IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	Bituminous Concrete
Date of Testing	17.01.2018

Result : Flakiness Index = 11.63%

Elongation Index = 13.52%

Result : Combined Flakiness & Elongation index 25.15%

Comments:

→ Maximum allowable Flakiness & Elongation Index for Bituminous Concrete is 30%

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DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	Executive Engineer, Byatarayanapura division, BBMP, Bangalore.
Agency	Sri. B.B. Umesh, Contractor, Bangalore.
Name of Work	Ammentties Construction of RO Water Plant Bangaluru one Center Providing Sodium Vapour Lights Sign Boards in Ward No. 9 10 and 11 Byatarayanapura Division as per Annexure GO NO UDD 217 SFC 2016 Dated 28.05.2016 Works Sl No. for Ward 09 33 to 34 Ward No.10 35 to 38 Ward No. 22 39 to 48, BBMP, Bangalore.
Technical Reference	IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	Bituminous Concrete
Date of Testing	18.01.2018

Result : Flakiness Index = 11.89%

Elongation Index = 14.10%

Result : Combined Flakiness & Elongation index 25.99%

Comments:

→ Maximum allowable Flakiness & Elongation Index for Bituminous Concrete is 30%

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Technical Reference	IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	Bituminous Concrete
Date of Testing	18.01.2018

Result : Flakiness Index = 12.36%

Elongation Index = 13.84%

Result : Combined Flakiness & Elongation index 26.20%

Comments:

→ Maximum allowable Flakiness & Elongation Index for Bituminous Concrete is 30%

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No.: CQCE/BBMP/BBU/ 2017-18

Specific Gravity And Water Absorption Test IS: 2386 Part III

Client	Executive Engineer, Byatarayanapura division, BBMP, Bangalore.
Agency	Sri. B.B. Umesh, Contractor, Bangalore.
Name of the Work	Ammentties Construction of RO Water Plant Bangaluru one Center Providing Sodium Vapour Lights Sign Boards in Ward No. 9 10 and 11 Byatarayanapura Division as per Annexure GO NO UDD 217 SFC 2016 Dated 28.05.2016 Works SI No. for Ward 09 33 to 34 Ward No.10 35 to 38 Ward No. 22 39 to 48, BBMP, Bangalore.
Type of Mix	Bituminous Concrete
Date of Testing	17.01.2018

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2020	2022	2024	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1265	1267	1269	
4	Weight of saturated surface dry aggregate in air	W_3 g	2015	2017	2019	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_s)$ g	750	750	750	
6	Weight of oven dried aggregate	W_4 g	2010	2011	2012	
7	Specific Gravity	$W_4 / (W_3 - W_s)$	2.680	2.681	2.683	2.681
8	Apparent Specific gravity	$W_4 / (W_4 - W_s)$	*2.698	2.703	2.708	2.703
9	Water Absorption	$((W_3 - W_4) * 100) / W_4$	0.25%	0.30%	0.35%	0.30%

Comments:

Maximum allowable Aggregate Water absorption value for Bituminous Concrete is 2.0%

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Job No.: CQCE/BBMP/BBU/2017-18

Date: 19.01.2018

TEST REPORT ON STABILITY OF MIX

Client	:	Executive Engineer, Byatarayanapura division, BBMP, Bangalore.
Agency	:	Sri. B.B. Umesh, Contractor, Bangalore.
Name of the Work	:	Ammentties Construction of RO Water Plant Bangaluru one Center Providing Sodiun Vapour Lights Sign Boards in Ward No. 9 10 and 11 Byatarayanapura Division as per Annexure GO NO UDD 217 SFC 2016 Dated 28.05.2016 Works SI No. for Ward 09 33 to 34 Ward No.10 35 to 38 Ward No. 22 39 to 48, BBMP, Bangalore.
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	19.01.2018

The results of the tests conducted on the Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	10.32	9.51	9 Kn (min)
2	Marshal flow, mm	2.36	3.74	2 - 4
3	Percent air voids in Mineral Aggregate	13.78	14.21	13 - 15
4	Voids in Compacted Mix	3.74	4.87	3 - 6
5	Percent Voids filled with Bitumen	71.41	72.85	65 - 75
6	Density, g/cc	2.26	2.27	--

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TEST REPORT ON STABILITY OF MIX

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Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	19.01.2018

The results of the tests conducted on the Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.52	10.32	9 Kn (min)
2	Marshal flow, mm	2.87	3.63	2 - 4
3	Percent air voids in Mineral Aggregate	13.89	14.52	13 - 15
4	Voids in Compacted Mix	3.98	4.17	3 - 6
5	Percent Voids filled with Bitumen	72.36	73.54	65 - 75
6	Density, g/cc	2.26	2.27	--

Note:

- ⇒ This test report shall not be reproduced except in full, without written approval of the laboratory.
- ⇒ The results indicated above are based on the tests carried out on the samples received in the laboratory.
- ⇒ Any Query regarding the report must be reported within 15 days from the date of testing.

AEE (VRP) SD

For CIVIL QUALITY CONSULTANTS & ENGINEERS



CIVIL QUALITY CONSULTANTS & ENGINEERS

(Buildings Geo-Tech & Highway Materials Testing Laboratory)

An ISO 9001: 2008 Certified Company



No.:

CQCE/BBMP/BBU/2017-18

Date : 09.01.2018

GRADATION FOR WMM MORTH TABLE-400-11

: **Executive Engineer**, Byatarayanapura division, BBMP, Bangalore.

: **Sri. B.B. Umesh**, Contractor, Bangalore.

Work

: Ammentties Construction of RO Water Plant Bangaluru one Center Providing Sodium Vapour Lights Sign Boards in Ward No. 9 10 and 11 Byatarayanapura Division as per Annexure GO NO UDD 217 SFC 2016 Dated 28.05.2016 Works Sl No. for Ward 09 33 to 34 Ward No.10 35 to 38 Ward No. 22 39 to 48, BBMP, Bangalore.

Testing

: 09.01.2018

Material Type

: Wet Mix Macadam

Oven Dry.Wt

10388

Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	356	356	3.4	96.6	95-100
22.4	3215	3571	34.4	65.6	60-80
11.2	2252	5823	56.1	43.9	40-60
4.75	1869	7692	74.0	26.0	25-40
2.36	1052	8744	84.2	15.8	15-30
0.600	745	9489	91.3	8.7	8-22
0.075	569	10058	96.8	3.2	0-8

Note:

The report shall not be reproduced, except in full, without the written approval of the laboratory.

The results indicated above are based on the tests carried out on the samples received in the laboratory.

Any Query regarding the report must be reported within 90 days from the date of testing.

For CIVIL QUALITY CONSULTANTS & ENGINEERS

Authorised Signatory